

60,130-1004 (96AUT013)

IN THE CLAIMS

Please cancel claim 32.

1.-22. (Cancelled)

23. (Currently Amended) An automotive vehicle drive unit assembly comprising:  
first and second driving axle shafts being co-linear and defining a lateral axis of rotation;  
first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation ~~to move a vehicle along a ground surface in a direction transverse to said lateral axis of rotation;~~  
a first gear set for driving said first wheel hub;  
a second gear set for driving said second wheel hub;  
a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that ~~is transverse to~~ intersects said lateral axis of rotation;  
a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that ~~is transverse to~~ intersects said lateral axis of rotation and is spaced apart from said first longitudinal axis of rotation; and  
first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation.

24. (Currently Amended) ~~An~~ The assembly as set forth in Claim 23 wherein said first and second planetary gear sets are incorporated into said first and second wheel hubs.

60,130-1004 (96AUT013)

25. (Currently Amended) ~~An~~The assembly as set forth in Claim 23, including a first gearbox for housing said first gear set and a second gearbox for housing said second gear set, said first and second gearboxes being mounted to said first and second electric motors respectively and wherein said first and second planetary gear sets are incorporated into said first and second gearboxes.

26. (Currently Amended) ~~An~~The assembly as set forth in Claim 23, wherein said first gear set includes a first pinion gear in driving engagement with a first ring gear mounted for rotation with said first wheel hub and said second gear set includes a second pinion gear in driving engagement with a second ring gear mounted for rotation with said second wheel hub.

27. (Currently Amended) ~~An~~The assembly as set forth in Claim 26, wherein said first planetary gear set includes a first sun gear mounted for rotation with said first ring gear and a first plurality of planet gears in meshing engagement with a first planetary ring gear hub; and said second planetary gear set includes a second sun gear mounted for rotation with said second ring gear and a second plurality of planet gears in meshing engagement with a second planetary ring gear hub.

28. (Currently Amended) ~~An assembly as set forth in Claim 27, An automotive vehicle drive unit assembly comprising:~~

first and second driving axle shafts being co-linear and defining a lateral axis of rotation;

60,130-1004 (96AUT013)

first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation to move a vehicle along a ground surface in a direction transverse to said lateral axis of rotation;

a first gear set for driving said first wheel hub wherein said first gear set includes a first pinion gear in driving engagement with a first ring gear mounted for rotation with said first wheel hub;

a second gear set for driving said second wheel hub wherein said second gear set includes a second pinion gear in driving engagement with a second ring gear mounted for rotation with said second wheel hub;

a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that is transverse to said lateral axis of rotation;

a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that is transverse to said lateral axis of rotation and spaced apart from said first longitudinal axis of rotation; and

first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation wherein said first planetary gear set includes a first sun gear mounted for rotation with said first ring gear and a first plurality of planet gears in meshing engagement with a first planetary ring gear hub and wherein said second planetary gear set includes a second sun gear mounted for rotation with said second ring gear and a second plurality of planet gears in meshing engagement with a second planetary ring gear hub wherein said first planetary ring gear hub drives said first wheel hub and said second planetary ring gear hub drives said second wheel hub.

60,130-1004 (96AUT013)

29. (Currently Amended) ~~An assembly as set forth in Claim 27,~~ An automotive vehicle drive unit assembly comprising:

first and second driving axle shafts being co-linear and defining a lateral axis of rotation;

first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation to move a vehicle along a ground surface in a direction transverse to said lateral axis of rotation;

a first gear set for driving said first wheel hub;

a second gear set for driving said second wheel hub;

a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that is transverse to said lateral axis of rotation;

a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that is transverse to said lateral axis of rotation and spaced apart from said first longitudinal axis of rotation; and

first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation wherein said first planetary gear set includes a first sun gear mounted for rotation with said first ring gear and a first plurality of planet gears in meshing engagement with a first planetary ring gear hub and wherein said second planetary gear set includes a second sun gear mounted for rotation with said second ring gear and a second plurality of planet gears in meshing engagement with a second planetary ring gear hub wherein said first planetary ring gear hub drives said first driving axle shaft and said second planetary ring gear hub drives said second driving axle shaft.

60,130-1004 (96AUT013)

30. (Currently Amended) ~~An~~The assembly as set forth in Claim 29, wherein said first planetary ring gear hub is integrally formed with said first driving axle shaft as one piece and said second planetary ring gear hub is integrally formed with said second driving axle shaft as one piece.

31. (Currently Amended) ~~An~~The assembly as set forth in Claim 30, wherein said first gear set and said first planetary gear set are housed within a first common gearbox mounted to said first electric motor, and said second gear set and said second planetary gear set are housed within a second common gearbox mounted to said second electric motor.

32. (Cancelled)

33. (Currently Amended) ~~An~~The assembly as set forth in Claim ~~32~~ 41, wherein said first and said third electric motors extend radially from said first gear set, and said second and said fourth electric motors extend radially from said second gear set.

34. (Currently Amended) ~~An~~The assembly as set forth in Claim 33, wherein said first gear set includes a first pinion gear driven by said first electric motor and a second pinion gear driven by said third electric motor, said first and second pinion gears for simultaneously driving a first ring gear and wherein said second gear set includes a third pinion gear driven by

60,130-1004 (96AUT013)

said second electric motor and a fourth pinion gear driven by said fourth electric motor, said third and fourth pinion gears for simultaneously driving a second ring gear.

35. (Currently Amended) ~~An~~ assembly as set forth in Claim 34, wherein said first gear set is housed within a first gearbox mounted to said first and third electric motors and said second gear set is housed within a second gearbox mounted to said second and fourth electric motors.

36. (Currently Amended) ~~An~~ The assembly as set forth in Claim 23, wherein said first and second longitudinal axes of rotation are perpendicular to said lateral axis of rotation.

37. (Currently Amended) ~~An assembly as set forth in Claim 23,~~ An automotive vehicle drive unit assembly comprising:

first and second driving axle shafts being co-linear and defining a lateral axis of rotation;

first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation to move a vehicle along a ground surface in a direction transverse to said lateral axis of rotation;

a first gear set for driving said first wheel hub;

a second gear set for driving said second wheel hub;

a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that is transverse to said lateral axis of rotation;

60,130-1004 (96AUT013)

a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that is transverse to said lateral axis of rotation and spaced apart from said first longitudinal axis of rotation; and

first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation wherein one of said first and second electric motors is mounted at a 90 degree angle extending generally horizontally and forwardly relative to said lateral axis of rotation and the other of said first and second electric motors is mounted at a 90 degree angle extending generally horizontally and rearwardly relative to said lateral axis of rotation.

38. (Currently Amended) ~~An~~ The assembly as set forth in Claim 23, wherein said first and second electric motors are supported by a common axle housing extending along said lateral axis of rotation.

39. (Currently Amended) ~~An~~ The assembly as set forth in Claim 23, wherein said first and second electric motors are mounted at a 90 degree angle extending generally vertically and upwardly from said lateral axis of rotation.

40. (Currently Amended) ~~An assembly as set forth in Claim 23, An automotive vehicle drive unit assembly comprising:~~

first and second driving axle shafts being co-linear and defining a lateral axis of rotation;

60,130-1004 (96AUT013)

first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation to move a vehicle along a ground surface in a direction transverse to said lateral axis of rotation;

a first gear set for driving said first wheel hub;

a second gear set for driving said second wheel hub;

a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that is transverse to said lateral axis of rotation;

a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that is transverse to said lateral axis of rotation and spaced apart from said first longitudinal axis of rotation; and

first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation wherein said first and second electric motors are mounted at an angle extending generally horizontally and rearwardly from said lateral axis of rotation.

41. (Previously Presented) An automotive vehicle drive unit assembly comprising:

first and second driving axle shafts being co-linear and defining a lateral axis of rotation;

first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation;

a first gear set for driving said first wheel hub;

a second gear set for driving said second wheel hub;



60,130-1004 (96AUT013)

first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation;

a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that is transverse to said lateral axis of rotation;

a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that is transverse to said lateral axis of rotation and spaced apart from said first longitudinal axis of rotation;

a third electric motor in parallel driving relationship with said first electric motor to drive said first gear set; and

a fourth electric motor in parallel driving relationship with said second electric motor to drive said second gear set wherein said first and third electric motors drive said first gear set and said second and fourth electric motors drive said second gear set independently from each other.

42. (Cancelled)

43. (Currently Amended) ~~An~~ The assembly as set forth in Claim 41, wherein said first gear set is housed within a first gearbox mounted to said first and third electric motors and said second gear set is housed within a second gearbox mounted to said second and fourth electric motors.

60,130-1004 (96AUT013)

44. (Currently Amended) ~~An~~The assembly as set forth in Claim 43, wherein said first gear set includes a first pinion gear in driving engagement with a first ring gear mounted for rotation with said first wheel hub and said second gear set includes a second pinion gear in driving engagement with a second ring gear mounted for rotation with said second wheel hub.

45. (Currently Amended) ~~An~~The assembly as set forth in Claim 44, wherein said first planetary gear set includes a first sun gear mounted for rotation with said first ring gear and a first plurality of planet gears in meshing engagement with a first planetary ring gear hub and said second planetary gear set includes a second sun gear mounted for rotation with said second ring gear and a second plurality of planet gears in meshing engagement with a second planetary ring gear hub.

46. (Currently Amended) ~~An~~The assembly as set forth in Claim 41 wherein said third electric motor defines a third longitudinal axis of rotation that is co-linear with said first longitudinal axis of rotation and said fourth electric motor defines a fourth axis of rotation that is co-linear with said second longitudinal axis of rotation.

47. (Cancelled)

60,130-1004 (96AUT013)

48. (Currently Amended) A vehicle comprising:

a vehicle body extending between lateral sides, passenger seats being mounted adjacent each of said lateral sides, a floor defined beneath said passenger seats, an aisle defined between said passenger seats, and said floor also extending beneath said aisle;

at least one driving axle for driving a pair of laterally spaced wheels including a first drive axle shaft associated with ~~the~~ a first wheel of said pair of laterally spaced wheels, and a second drive axle shaft associated with ~~the~~ a second wheel of said pair of laterally spaced wheels, said first and second drive axle shafts defining a lateral axis of rotation;

a first gear set and a second gear set for driving said first and second wheels;

a first planetary gear set and a second planetary gear set driven by said first and second gear sets about said lateral axis of rotation;

a first electric motor mounted at a non-parallel angle relative to said lateral axis of rotation ~~of said first drive axle shaft~~ for driving said first gear set, and a second electric motor mounted at a non-parallel angle relative to said lateral axis of rotation ~~of said second drive axle shaft~~ and operatively connected to drive said second gear set wherein said first and second electric motors drive said first and second planetary gear sets to move a vehicle along a ground surface in a direction transverse to said lateral axis of rotation; and

said first and second electric motors being mounted adjacent to said first and second wheels at a vertical position which is higher than a vertical position of the floor of said aisle.

49. (Currently Amended) ~~A~~ The vehicle as set forth in Claim 48, including a third electric motor mounted in parallel driving relationship with said first electric motor to assist in

60,130-1004 (96AUT013)

driving said first gear set and a fourth electric motor mounted in parallel driving relationship with said second electric motor to assist in driving said second gear set.

50. (Currently Amended) ~~A~~The vehicle as set forth in Claim 49, wherein said first planetary gear set is driven by said first and third electric motors via said first gear set for speed reduction at said first wheel and said second planetary gear set is driven by said second and fourth electric motors via said second gear set for speed reduction at said second wheel.

51. (Currently Amended) ~~An assembly as set forth in Claim 23 including~~An automotive vehicle drive unit assembly comprising:

first and second driving axle shafts being co-linear and defining a lateral axis of rotation;

first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation to move a vehicle along a ground surface in a direction transverse to said lateral axis of rotation;

a first gear set for driving said first wheel hub;

a second gear set for driving said second wheel hub;

a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that is transverse to said lateral axis of rotation;

a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that is transverse to said lateral axis of rotation and spaced apart from said first longitudinal axis of rotation;

first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation;

60,130-1004 (96AUT013)

a first motor output shaft rotatable about said first longitudinal axis of rotation and a second motor output shaft rotatable about said second longitudinal axis of rotation;

said first gear set including a first pinion gear driven by said first motor output shaft and mounted for rotation about said first longitudinal axis of rotation and a first ring gear driven by said first pinion gear about said lateral axis of rotation;

said first planetary gear set including a first sun gear coupled for rotation with said first ring gear about said lateral axis of rotation;

said second gear set including a second pinion gear driven by said second motor output shaft and mounted for rotation about said second longitudinal axis of rotation and a second ring gear driven by said second pinion gear about said lateral axis of rotation; and

said second planetary gear set includes a second sun gear coupled for rotation with said second ring gear about said lateral axis of rotation.

52. (Currently Amended) ~~An~~ The assembly as set forth in claim 51 wherein said first sun gear is directly coupled to said first ring gear and said second sun gear is directly coupled to said second ring gear.

53. (Currently Amended) ~~An~~ The assembly as set forth in claim 51 wherein said first driving axle shaft is driven by said first ring gear and said first sun gear is driven by said first driving axle shaft and said second driving axle shaft is driven by said second ring gear and said second sun gear is driven by said second driving axle shaft.

60,130-1004 (96AUT013)

54. (Currently Amended) ~~An~~The assembly as set forth in claim 51 wherein said first planetary gear set is positioned adjacent to said first motor output shaft and between said first ring gear and said first driving axle shaft and wherein said second planetary gear set is positioned adjacent to said second motor output shaft and between said second ring gear and said second driving axle shaft.

55. (Currently Amended) ~~An~~The assembly as set forth in claim 51 wherein said first planetary gear set is positioned adjacent to said first wheel hub at a distal end of said first driving axle shaft and said second planetary gear set is positioned adjacent to said second wheel hub at a distal end of said second driving axle shaft.

56. (Cancelled)

57. (Currently Amended) ~~An assembly as set forth in claim 23 including~~An automotive vehicle drive unit assembly comprising:

first and second driving axle shafts being co-linear and defining a lateral axis of rotation;

first and second wheel hubs driven by said first and second driving axle shafts respectively about said lateral axis of rotation to move a vehicle along a ground surface in a direction transverse to said lateral axis of rotation;

a first gear set for driving said first wheel hub;

a second gear set for driving said second wheel hub;

60,130-1004 (96AUT013)

a first electric motor for driving said first gear set and defining a first longitudinal axis of rotation that is transverse to said lateral axis of rotation;

a second electric motor for driving said second gear set and defining a second longitudinal axis of rotation that is transverse to said lateral axis of rotation and spaced apart from said first longitudinal axis of rotation;

first and second planetary gear sets driven by said first and second gear sets about said lateral axis of rotation;

a first motor output shaft rotatable about said first longitudinal axis of rotation and directly coupled to said first gear set; and

a second motor output shaft rotatable about said second longitudinal axis of rotation and directly coupled to said second gear set such that said first and second longitudinal axes of rotation intersect said lateral axis of rotation.

58. (Currently Amended) A-~~The~~ vehicle as set forth in claim 48 including a first motor output shaft rotatable about a first longitudinal axis of rotation and directly coupled to said first gear set and a second motor output shaft rotatable about a second longitudinal axis of rotation and directly coupled to said second gear set such that said first and second longitudinal axes of rotation intersect said lateral axis of rotation.